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PATENT



SPECIFICATION

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PROVISIONAL SPECIFICATION.

Improvements in or relating to Apparatus for the Irrigation of Wounds.

We, WALTER HERBERT TAYLOR, of Carlton Mansions, 2, Bedford Place, Bloomsbury Square, in the County of London, Surgeon, and JAMES ERNEST ARNOLD, of the Firm of Arnold & Sons, of 6, Giltspur Street, in the City of London, Instrument Makers, do hereby declare the nature of this invention to be as follows:—

The present invention refers to certain improvements in or relating to apparatus for the treatment of wounds in the human body, comprising a chamber open at both ends and having an external flange at what is termed its lower end. The upper end of the chamber is fitted with a suitable means of closure, and the appliance is placed in such position that the chamber becomes located over the wound and the flange in close contact with the person of the patient, and tubes enter the chamber to serve as ways by which solution is delivered to the wound and by which the solution is allowed to pass away.

According to the present invention, we now provide the lower wall of such flange with an annular suction ring to contact with the skin of the patient. In this construction the appliance which is conveniently made of indiarubber, consists of an upper collar the base of which conjoins the inner edge of an annular sheet of rubber, which we will term the top sheet, the outer edge of which top sheet is returned for a distance below the said top sheet, and upon the under face of the return portion the suction ring is fixed or formed.

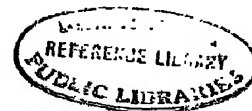
The suction ring should be constructed of very flexible material, such for instance as gum rubber, and it should be formed around its under surface with a gutter, the two sharp lips of the rubber on either side of which gutter are designed to grip the skin when the air is rarefied in the gutter.

At one point in the circumference of the suction ring a short tube leads from the gutter to the open space inside the collar, and this tube is valved to permit air to pass from the gutter and to prevent air or fluid entering the gutter, and thus when a negative pressure is once formed in the gutter it is maintained, and the appliance is thus held to the skin of the patient by this liquid-tight suction ring.

Passing through the collar to the interior of the casing is a drainage tube extending to the bottom of the wound, and this is connected in any suitable manner on the exterior of the appliance to a two-way branch leading in one direction to the inflow pipe and in another direction to the outflow pipe.

Clips or closure devices of any approved construction are fitted, one for the

[Price 6d.]



closure of the collar, one for the closure of the inflow pipe, and the other for the closure of the outflow pipe.

A washer of poro-plastic felt is passed over the collar and lies upon the upper wall of the flange-like casing.

In using such an appliance it is laid on the skin of the patient so that the suction ring surrounds the wound, the said ring being larger in diameter than the wound, the washer of poro-plastic felt being placed in position, and the whole bandaged snugly to the wound, and the collar is closed.

In order to create a negative pressure beneath the suction ring, the clips of the inflow and outflow tubes are released and those tubes so opened, and the fluid is permitted to have a straight fall through the inflow and the outflow tubes to a waste vessel; this proceeding not only aspirates the wound and collapses the collar, but rarefies the air in the gutter of the suction ring through the valved tube, the said valve in the tube preventing return of air or liquid and so maintaining the suction, even when a positive pressure obtains in the wound and in the collar.

In order to flood the wound the outflow tube is closed, the collar distends, and the fluid fills the space between the top wall of the flanged casing (which is restrained from distension by the felt washer and bandages) and the broad upper surface of the suction ring, the fluid exerting pressure in all directions and using the bandages as a *point d'appui*, forcing the thin rubber lips of the suction ring against the skin.

To suck the wound out the inflow tube is closed and the outflow tube opened, the fluid syphons away until a strong negative pressure is created in the wound and beneath the collar, and the negative pressure beneath the suction ring is also thus renewed.

Dated this 28th day of August, 1917.

BREWER & SON,  
33, Chancery Lane, London,  
Patent Agents for the Applicants. 30

### COMPLETE SPECIFICATION.

#### Improvements in or relating to Apparatus for the Irrigation of Wounds.

We, WALTER HERBERT TAYLOR, of Carlton Mansions, 2, Bedford Place, Bloomsbury Square, in the County of London, Surgeon, and JAMES ERNEST ARNOLD, of the Firm of Arnold & Sons, of 6, Giltspur Street, in the City of London, Instrument Makers, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

A treatment of wounds in the human body is already known by which sterilisation is attained by irrigation of the wounded area with antiseptic solution, but in the practical application of such treatment, difficulties are experienced. In carrying out such treatment a tube has been inserted into the wound, supplied with liquid such as antiseptic solution the supply of which is placed at an elevation so as to produce a head of pressure, and the overflow of the solution from the wound then presents a practical difficulty in the application of such treatment.

In carrying out the treatment it has been heretofore proposed to provide a nozzle which may be formed of glass having several subsidiary tubes proceeding

therefrom, the nozzle being supplied with the necessary liquid at a proper head of pressure, and the subsidiary tubes are each fitted with an irrigation tube composed say of narrow bore rubber closed at one end and near the closed end having a number of fine lateral perforations, these irrigation tubes being  
5 inserted into the wound so as to provide for the uniform distribution of the antiseptic to the entire surface of the wound; the supply is thus effected by means of a single tube and is distributed to the various points or cavities in the wound which are considered necessary to be so treated; so that sprays of liquid from the irrigation tubes play over the whole surface of the wound and  
10 pass away by a drainage opening at the most dependent part of the wound.

The object of the present invention is to provide improved apparatus for carrying out this treatment, but by which the liquid which has been employed in the flushing or periodic flushing of the surfaces is carried away without causing difficulty, and at the same time to provide that a liquid-tight joint  
15 shall be produced without undue pressure and that the joint can be maintained through the desired period in which it is required the apparatus should be in use; the primary feature of novelty of the present invention therefore consists in the means by which the liquid-proof joint between the skin of the patient and the apparatus is made.

According to this invention a chamber is formed which may be broadly described as consisting of a diaphragm of flexible liquid-proof material such as indiarubber, having an edge or surrounding surface composed of an annular  
20 suction ring which can be made of very flexible material such as gum rubber, to contact with the skin of the patient and by which a liquid-proof joint can be obtained and maintained between the said edge or surrounding surface and the skin of the patient; a pipe or pipes enters or enter the chamber so formed within the diaphragm, to conduct liquid into the wound and to carry off the liquid therefrom.

The annular suction ring which as aforesaid can be made of very flexible material such as gum rubber, should be preferably formed around its under  
30 face with a gutter, two sharp lips of rubber on either side of which gutter are designed to grip the skin when the air is rarefied in the gutter. In combination with such an apparatus as has been described an inspection opening may be provided in the wall of the chamber through which the wound can be inspected, and means are provided for closing the inspection opening in a  
35 liquid-tight manner.

The annular space of the suction ring may be fitted with a tube governed by a non-return valve with the interior of the chamber, and the inlet and outlet pipes of the chamber may be so arranged that by controlling the same  
40 a suction may be produced within the chamber.

Apparatus for various purposes have heretofore been proposed to be applied to the person of the patient and into which liquid can be introduced and from which it can be carried away, as for instance in washing or treating the skin with liquid a cup of metal or other material has been suggested having an  
45 edge formed by a rubber ring which is pressed against the skin of the patient, and it has been proposed to introduce liquid into the cup by a pipe and to remove the liquid therefrom by suction, and obviously in such apparatus it is necessary to maintain the edge of the cup in sufficient pressure contact over a comparatively small area with the skin of the patient to produce a liquid-  
50 tight joint.

In the following description there will now be described an example of the carrying out of this invention, reference being had to the accompanying drawings.

Fig. 1 shows an example of construction of the apparatus by a sectional  
55 elevation, and Fig. 2 illustrates a general view of the application of the appliance to the leg of a patient.

In the example of construction shown on the drawings, the diaphragm

consists of an annular sheet of indiarubber 1 formed centrally with a cylindrical extension or collar 2 to provide an inspection aperture, and upon the under face of the diaphragm 1 the suction ring 3 is fixed or formed.

The suction ring 3 should be constructed of very flexible material as aforesaid, such for instance as gum rubber, and it should be formed around its under surface with a gutter as shown, the two sharp lips of the rubber on either side of which gutter are designed to grip the skin when the air is rarefied in the gutter.

At one point in the circumference of the suction ring 3 a short tube 4 leads from the gutter of the ring 3 to the open space inside the chamber of the appliance formed by the diaphragm 1 and suction ring 3, and this tube 4 is valved, say at 5, to permit air to pass from the gutter and to prevent air or fluid entering the gutter, and thus when a negative pressure is once formed in the gutter it is maintained, and the appliance is thus held to the skin of the patient by this liquid-tight suction ring 3.

Passing through the collar 2 to the interior of the casing is a tube 6 extending to the bottom of the wound, and this is connected in any suitable manner as by a tube 7 on the exterior of the appliance to a two-way branch 8 leading in one direction to the inflow pipe 9 and in another direction to the outflow pipe 10.

Clips or closure devices of any approved construction are fitted, one 11 for the closure of the collar 2, one indicated at 12 for the closure of the inflow pipe 9, and the other indicated at 13 for the closure of the outflow pipe 10.

A washer 14 of poro-plastic felt is passed over the collar 2 and lies upon the top sheet of the diaphragm 1 of the casing.

In using such an appliance it is laid on the skin of the patient so that the suction ring 3 surrounds the wound, the said ring being larger in diameter than the wound, the washer 14 of poro-plastic felt being placed in position; and the whole bandaged snugly to the wound as at Fig. 2, and the collar 2 is closed.

In order to create a negative pressure beneath the suction ring 3, the clips 12 and 13 of the inflow and outflow tubes 9 and 10 are relieved and those tubes so opened, and the fluid is permitted to have a straight fall through the inflow and the outflow tubes to a waste vessel not shown; this proceeding not only aspirates the wound and collapses the collar 2, but rarefies the air in the gutter of the suction ring 3 through the valved tube 4, the said valve in the tube 4 preventing return of air or liquid and so maintaining the suction, even when subsequently a positive pressure obtains in the wound and in the collar 2.

In order to flood the wound the outflow tube 10 is closed, the collar 2 distends, and the fluid fills the space between the diaphragm 1 (which is restrained from distension by the felt washer 14 and bandages 15) and the suction ring 3, the fluid exerting pressure in all directions and using the bandages as a *point d'appui*, forcing the thin rubber lips of the suction ring 3 against the skin.

To suck the wound out, the inflow tube 9 is closed and the outflow tube 10 opened, and fluid syphons away until a strong negative pressure is created in the wound and beneath the collar 2, and the negative pressure beneath the suction ring 3 is also thus renewed.

Obviously in the construction shown at Fig. 1, the suction ring 3 might be formed on the under face of the diaphragm 1.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In apparatus for the treatment of wounds by irrigation of the wounded area with a suitable liquid; a diaphragm of flexible liquid-proof material such

as indiarubber, having its edge or surrounding surface which is to contact with the skin of the patient in a liquid-tight manner to form a chamber, formed or provided with an annular suction ring to constitute a gutter bounded by two sharp lips of rubber to grip the skin of the patient, in combination with a  
5 pipe or pipes to conduct the liquid into and from the apparatus.

2. In an apparatus for the treatment of wounds as claimed by Claim 1; forming an inspection opening in the diaphragm or wall of the chamber through which opening the wound can be inspected, and means for closing said inspection opening in a liquid-tight manner.

10 3. In apparatus as claimed by Claim 1; providing a tube or passage communicating with the annular space formed by the suction ring and governed by a non-return valve.

4. In apparatus as claimed by Claim 1; the means for retaining the apparatus in position and controlling its form, comprising a plate of felted or other  
15 material superposed upon the diaphragm or wall of the structure, and bandages passing over the plate aforesaid, substantially as described.

5. In apparatus as claimed by Claim 1; providing a pipe entering the chamber, fitted with a flexible inner end or ends to enter the wound, said pipe being provided exteriorly of the chamber with a two-way branch leading in  
20 one direction to an inflow pipe and in another direction to an outflow pipe, and closure devices adapted to close when required either the inflow pipe or the outflow pipe whereby a negative pressure may be created in the chamber by allowing liquid to pass directly from the inflow pipe through the outflow pipe by the branch aforesaid, or whereby the outflow pipe may be closed and the  
25 wound flooded through the inflow pipe, or whereby the liquid may be syphoned from said chamber by closing the inflow pipe and opening the outflow pipe.

6. The apparatus for the treatment of wounds by irrigation, constructed and acting substantially as described with reference to the accompanying drawings.

Dated this 1st day of October, 1917.

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BREWER & SON,  
33, Chancery Lane, London,  
Patent Agents for the Applicants.

FIG: 1.

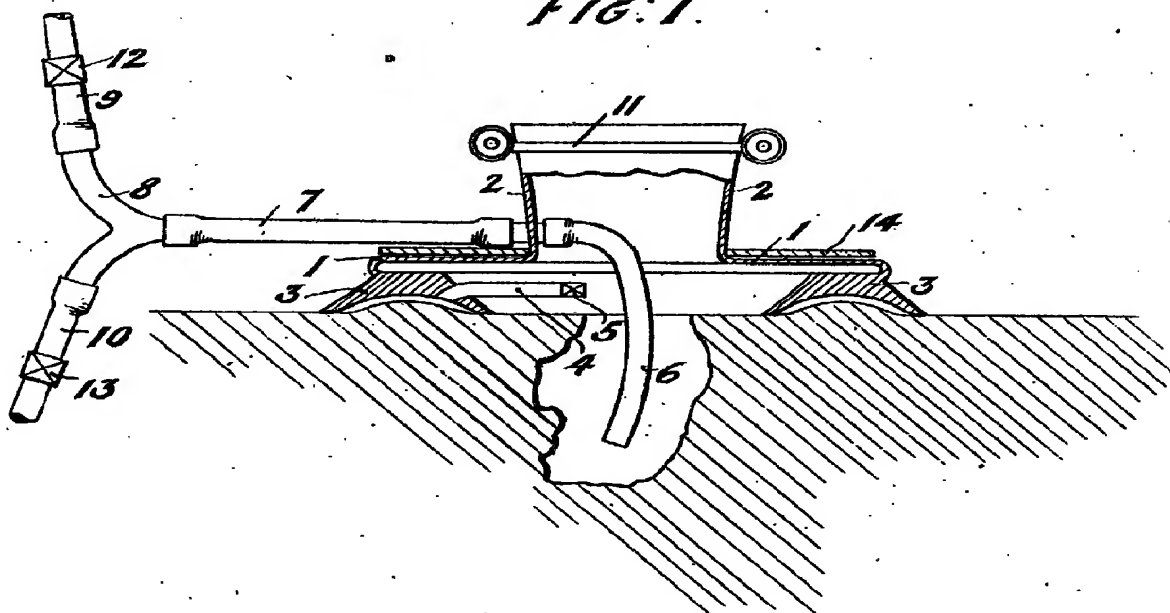
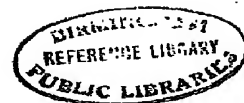
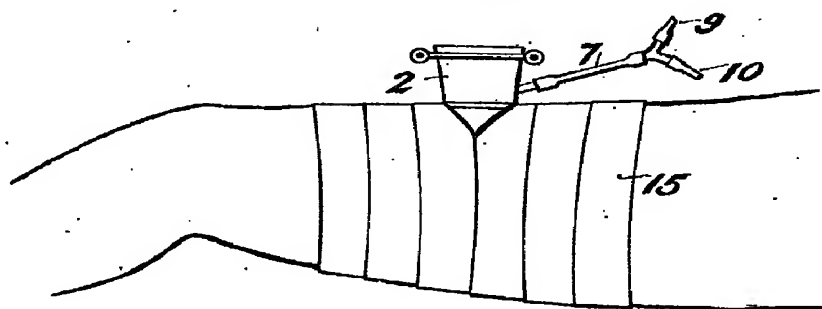


FIG: 2.



[This Drawing is a reproduction of the Original on a reduced scale.]